

PRELIMINARY AMENDMENT

Serial Number: 09/132,157

Filing Date: August 11, 1998

Title: SILICON-GERMANIUM DEVICES FOR CMOS FORMED BY ION IMPLANTATION AND SOLID PHASE EPITAXIAL REGROWTH

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Dkt: 303.229US2

wherein the $\text{Si}_{1-x}\text{Ge}_x$ channel region [has a channel length less than $7\mu\text{m}$] is formed subsequent to formation of the gate oxide

25. (Twice Amended) A p-channel metal-oxide-semiconductor transistor formed on a silicon substrate, comprising:

Contd
F2
a $\text{Si}_{1-x}\text{Ge}_x$ channel region, having a germanium molar fraction of x , and formed in the substrate, underneath a gate oxide and between a source region and a drain region without a silicon layer interposed between the $\text{Si}_{1-x}\text{Ge}_x$ channel region and the gate oxide;

Sub
G3
wherein the $\text{Si}_{1-x}\text{Ge}_x$ channel region is formed from ion implanting germanium (Ge) into the substrate at a dose of approximately 2×10^{16} atoms/ cm^2 , and wherein the Ge is implanted at an energy of approximately 20 to 100 keV; and

wherein the $\text{Si}_{1-x}\text{Ge}_x$ channel region [has a channel length less than $7\mu\text{m}$] is formed subsequent to formation of the gate oxide.

Sub
G4
F3
28. (Thrice Amended) A p-channel metal-oxide-semiconductor transistor formed on a silicon substrate, comprising:

a $\text{Si}_{1-x}\text{Ge}_x$ channel region, having a germanium molar fraction of 0.2, and formed in the substrate, underneath and adjoining a gate oxide and between a source region and a drain region;

wherein the $\text{Si}_{1-x}\text{Ge}_x$ channel region [has a channel length less than $7\mu\text{m}$] is formed subsequent to formation of the gate oxide.

Sub
G5
30. (Thrice Amended) A p-channel metal-oxide-semiconductor transistor on a silicon substrate, wherein the transistor includes a channel comprising a silicon-germanium (Si-Ge) alloy underneath and adjoining a gate oxide, wherein the [channel has a channel length less than $7\mu\text{m}$] silicon-germanium alloy is formed subsequent to formation of the gate oxide.

F4
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G6
38. (Once amended) A p-channel metal-oxide-semiconductor transistor, comprising:
a silicon substrate;

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Cont'd #4
a gate oxide, coupled to the substrate;
a gate, coupled to the gate oxide;
source/drain regions formed in the substrate on opposite sides of the gate; and
a $\text{Si}_{1-x}\text{Ge}_x$ channel region, having a germanium molar fraction of x , and formed in the substrate, underneath and adjoining the gate oxide and between the source/drain regions;
wherein the $\text{Si}_{1-x}\text{Ge}_x$ channel region is formed from ion implanting germanium (Ge) through the gate oxide; and
wherein the germanium molar fraction is less than about 0.6.

Sub C7
40. (Once amended) A ~~p-channel metal-oxide-semiconductor~~ transistor formed on a silicon substrate, comprising:
a $\text{Si}_{1-x}\text{Ge}_x$ channel region, having a germanium molar fraction of x , and formed in the substrate, underneath and adjoining a gate oxide and between a source region and a drain region;
wherein the $\text{Si}_{1-x}\text{Ge}_x$ channel region is formed from ion implanting germanium (Ge) through the gate oxide; and
wherein the germanium molar fraction is less than about 0.6; and
wherein the $\text{Si}_{1-x}\text{Ge}_x$ channel region has a channel length less than $7\mu\text{m}$.
F5

Sub H8
41. (Once amended) A ~~p-channel metal-oxide-semiconductor~~ transistor formed on a silicon substrate, comprising:
a $\text{Si}_{1-x}\text{Ge}_x$ channel region, having a germanium molar fraction of x , and formed in the substrate, underneath a gate oxide and between a source region and a drain region without a silicon layer interposed between the $\text{Si}_{1-x}\text{Ge}_x$ channel region and the gate oxide;
wherein the $\text{Si}_{1-x}\text{Ge}_x$ channel region is formed from ion implanting germanium (Ge) into the substrate through the gate oxide at a dose of approximately 2×10^{16} atoms/cm², and wherein the Ge is implanted at an energy of approximately 20 to 100 keV; and
wherein the germanium molar fraction is less than about 0.6; and
wherein the $\text{Si}_{1-x}\text{Ge}_x$ channel region has a channel length less than $7\mu\text{m}$.